GROWING and MARKETING Christmas Trees

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GROWING & MARKETING CHRISTMAS TREES

Excellent Fraser fir plantation 6 years old.

North Carolina could be a major producer of Christmas trees. Climate, nearness to large metropolitan markets, and excellent transportation facilities should enable it to sell all the high-quality trees it can grow at competitive prices.

Local requirements are substantial. Each year approximately 1,000,000 Christmas trees are used in North Carolina. Currently, 80 per cent come in from Canada and Nova Scotia, with the remaining 20 per cent home grown. These home-grown trees are harvested mainly from pastures and farm woodlots, with only a relatively few trees from managed plantations.

The managed plantation is the key to growing high-quality Christmas trees. Recognizing this, North Carolina Christmas tree growers have organized a Christmas Tree Growers' Cooperative. The purpose of this organization is to increase interest in commercial Christmas tree plantations and to encourage production of top-quality trees.

On a national scale, the growing and marketing of Christmas trees is big business. In 1959, approximately 40,000,000 trees were marketed in the United States. Of this total, 10,000,000 were imported from Canada and Nova Scotia, with the balance harvested from farm woodlots and managed Christmas tree plantations in the United States. This represents an estimated $60,000,000 retail business.

Demand for Christmas trees will increase as more family units come into being. According to the U. S. Census Bureau, the population will have increased approximately 12 per cent by 1975. This will mean a corresponding increase in the Christmas tree market.

North Carolina can obtain its share of the national and local market because we can produce a better product and supply it fresh to the markets.

This publication discusses the many problems involved in growing and marketing Christmas trees and outlines ways to cope with them.

Steps In Establishing A Christmas Tree Plantation

Christmas trees are a product of the land. When grown as a specific farm crop, they are often the results of a well-managed and planned enterprise.

A grower needs to consider many steps when planning his Christmas tree program.

Establishment of a Christmas tree plantation involves many important steps. The assumption is made here that production is based on seedlings set out in plantations which will be maintained and protected.

The product to be grown must have consumer appeal. Regardless of species, the average buyer wants a tree that has, as nearly as possible, the following characteristics:

1. Symmetrical shape
2. Strong lateral bronches
3. Good needle retentian
4. Pleasing appearance
5. Pleasent adar

Selecting the Proper Evergreen Species

Several species of evergreen trees can be grown in North Carolina for Christmas trees. Your choice will depend on several things:

1. Consumer appeal
2. Soil characteristics of your land
3. Climatic requirements and elevotion
4. Rate of growth
5. Availabliity of planting stock
6. Insect and disease hazards

Most commercial species now being grown in North Carolina are: Redcedar in the Coastal Plains and Piedmont; Fraser fir and white pine at the higher elevations in the mountains.

Some growers are beginning to try other species, adapted to their locality, that have the distinctive characteristics which appeal to Christmas tree buyers. The newer species include: Scotch pine, Norway spruce, Colorado blue spruce, Douglas fir, and Arizona cypress.

Arizona cypress and Scotch pine will grow in the Coastal and Piedmont areas, while Colorado blue spruce, Norway spruce, and Douglas fir grow at higher elevations along the Appalachian Mountain range.

It is advisable to plant more than one species, since all buyers will not want the same kind of tree. Select trees native to your area; then add a few of the newer species on a trial basis.

Table 1. Species Adapted for Christmas Tree Production in North Carolina

Coastal Plains	Piedmont	Mountains
Redcedar (Juniperus virginiana)	Redcedar	Fraser fir (Abies fraseri)
Scotch pine (Pinus sylvestris)	White pine	White pine (Pinus strabus)
Arizona cypress (Cupressus arizonica)	Norway spruce	Norway spruce (Picea obies)
	Scotch pine	Douglas fir (Pseudotsuga menziesii)

To make a wise selection of Christmas tree species to plant, you need to recognize the characteristics the consumer looks for in choosing a tree and the good and poor characteristics in the evergreens adapted to your area.

Characteristics of some evergreen varieties

Fraser fir (Abies fraseri)—An outstanding tree from the standpoint of the consumer. It has excellent color and needle-holding ability, pleasing fragrance, and strong branches with a slight turn-up to give the tree a compact appearance. The tree is easy to handle and transport. It grows well at higher elevations on cool, moist sites. Its natural range occurs along the higher elevations of the Southern Appalachians. However, it can be grown successfully down to 2,000 feet if planted on north to northeast slopes in areas of high rainfall. It requires 6 to 8 years to reach salable size. Shearing and pruning are necessary to produce good trees.

Douglas fir (Pseudotsuga menziesii)—Very good color and appearance, with longer needles than Fraser fir. It has very good needle retention, and handles and transports well. Branches will not support heavy decorations quite as well as Fraser fir. It is subject to drought and late-frost damage, and requires a cool, well-drained site. Seedlings from the Colorado blue strain seed source show the best promise. It grows to 6 feet in 7 to 9 years.

Norway spruce—Fair color, but has very poor needle retention. The needles are short and sharp, but the tree has very attractive appearance. It grows best on cool, moist sites, and can be grown successfully at lower elevation than Fraser fir on carefully selected sites. It grows to 6 feet in 6 to 9 years on good sites.

White spruce (Picea glauca)—Characteristics similar to Norway spruce.

Colorado blue spruce—Exceptional color and pleasing appearance, but has short, sharp needles that make it hard to decorate. It is better as an ornamental than as a Christmas tree. It is similar to Norway spruce in growth habits, except it is a much slower grower. It takes from 8 to 12 years to grow into a 6-foot tree.

White pine (Pinus strobus)—Excellent color with good needle reten-

A premium grade Fraser fir Christmas tree.

Douglas fir.

Narway spruce. White spruce is very similar in appearance.

Colorado blue spruce.

White pine that has been sheared.

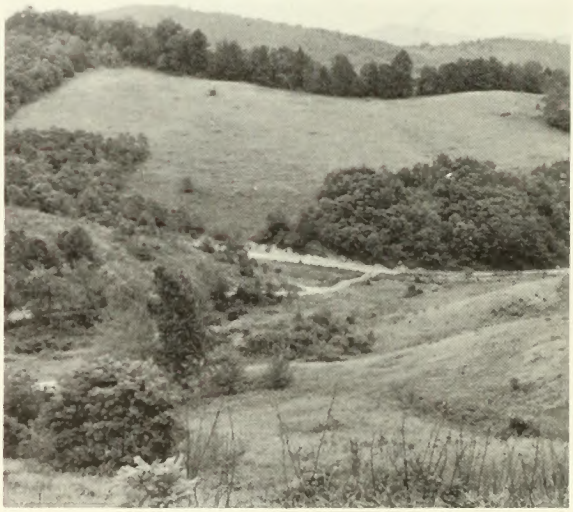
Scotch pine.

tion; has silver-green appearance and very soft foliage. This is a fast-growing tree on average to good sites, and requires heavy shearing to produce a compact, symmetrical tree. There is occasional heavy shedding of 2- and 3-year-old needles. It grows to 6 feet in 5 to 7 years.

Scotch pine (Pinus sylvestris)—Has excellent needle retention. The color ranges from good to poor, depending on the strain. It is subject to crooked stem and fast growth, requiring heavy shearing to produce a quality tree. This tree is very hardy and grows well on most sites. Strong branches and good fire resistance make it a good Christmas tree when managed properly. It grows 6 feet tall in 5 to 7 years and shows promise in North Carolina from the Coastal Plain through the mountain region.

Virginia pine (Pinus virginiana)—Fair color and needle retention; grows well on poor sites, but heavy needle shedding gives it an open appearance. It grows irregularly, with a crooked stem, and requires a medium amount of shearing. It is a good tree for spraying or flocking. More experimental work is required before growing of this tree extensively can be recommended.

Redcedar (Juniperus virginiana)—Good to poor color, depending on the severity of late-fall and early-winter weather. Has excellent fragrance. The tree has very poor needle retention and, after cutting dries out quickly, presenting a fire hazard unless treated or the base of the tree is placed in water immediately after cutting. It grows very compact and requires little shearing except on good sites where growth is rapid. This tree grows well from the Coastal Plain through the Piedmont. It grows to 6 feet in 5 to 7 years.



Typical planting site in the mountains.

Table 2. Quality Chorocteristics of Some Christmos Tree Species That Can Be Grown in North Corolina

Species	Frogronce	Color	Stiffness of Twig	Shipping Quolities	Needle Retention	Expected Height in 6 to 8 yrs.	Freedom from Pests
Redcedar	Excellent	Fair to poor	Fair	Poor	Poar	6 feet	Poor
White pine	Gaad	Very good	Gaad	Good	Good	6 feet	Fair
Fraser fir	Excellent	Excellent	Excellent	Excellent	Excellent	5 feet	Excellent
Norway spruce	Gaad	Good	Good	Gaad	Fair	6 feet	Poor
Dauglos fir	Very good	Excellent	Fair	Excellent	Very good	6 feet	Very gaad
Scotch pine	Good	Gaad to poor	Excellent	Good	Excellent	6 feet	Poor

Toble 3. Site Requirements far Four Major Christmos Tree Species

Species	Elevation	Sail Type	Acidity	Exposure
Froser fir	2000-4000 ft.	Deep, well-drained sandy laom sail	pH 3.5 ta 5.5	North to northeost slopes[1]
	Abave 4000 ft.	Shollow sails, well drained	pH 3.5 to 5.5	Any exposure except sauthwest to western[1]
White pine	Upper Piedmont	Gaad, well-drained sails	Wide range	North-ond east-focing slapes[1]
	Mountains[2]	Does well an most sail types when well drained	Wide ronge	Any exposure
Norwoy spruce	Upper Piedmont Mountains	Well-drained, sondy loams	pH 6.0 to 7.0	Any exposure except sauthwest ta western[1]
Eastern redcedor	Coostal Plains[3]	Graws well an all soil types exçept deep sand	Neutrol to alkaline soil	All exposures except western
	Piedmont		Above pH 6.5	

[1] *Avoid all known frost-pocket areas.*
[2] *Above 3,000 feet, check for gooseberry and currant bushes to prevent blister rust disease. Clear 400-foot area around planting.*
[3] *Do not plant redcedar in commercial apple-growing counties because of cedar-apple rust.*

Selecting and Preparing the Planting Site

Many problems and difficulties can be avoided by wise selection. Soils and site, exposure and elevation, particularly in the mountains and upper Piedmont, must be carefully considered in relation to the species planted. *Frost* pockets must be avoided. Some species are sensitive to drying winter winds, severe drought and excess lime in old pastures and fields.

General site requirements for several species are given in table 3. Fraser fir is more exacting in its site requirements than other species; therefore, examine carefully all planned planting sites.

In preparing planting sites, study carefully species' growth habits and root structure. Fraser fir is a very shallow-rooted tree that requires much moisture; whereas white pine is more deeply rooted and can grow on drier sites.

Other factors to consider when selecting the site for your Christmas tree plantation are:

1. **Accessibility to good roads**
2. **Topography**
3. **Present vegetative cover**
4. **Soil and climatic conditions**
5. **Value of the land**

Locate Christmas tree plantation close to good roads: Adverse weather conditions at harvest time can completely curtail harvesting, especially in the mountains, unless plantation is near all-weather roads. Most harvesting will be done with mules, tractors, and by hand; but the central loading area must be located where large trucks can reach it in all kinds of weather to minimize delay in trees reaching their destination. Otherwise, the cost of harvesting and transportation will offset much of the profit from the Christmas trees sold. Theft may be a problem where plantations are located along main roads and away from home. Take precautions to insure against this.

Topography is important: Level to rolling land is best suited for Christmas trees. In the mountain areas, however, examine possible sites carefully. See if harvest roads and firebreaks can be built and maintained and if needed cultural practices, such as mowing or chemical spraying for weed control, can be carried out. If land is too steep, the cost of moving trees out of the plantation may be great.

Plantations should be broken down into small plots of 1 to 5 acres with firebreaks, used for both fire control and harvesting, around each plot.

Select cultivatable land: For best results plant Christmas trees on cultivatable land. If area has been out of crops for any length of time, it is probably covered with bushes and young trees. Such growth is difficult and costly to control. If there is a present heavy sod of fescue, clover, blue grass, or lespedeza, disk the area in the early fall before the winter and spring-planting season. If land is too steep for disking, make a 24-inch-diameter scalp and plant seedling in the center of the scalped spot. Freshly cut timberland should not be selected unless the cut stumps and undergrowth have been poisoned with 2,4,5-T to dis-

courage future sprouting. Generally, areas with little or no brush and very little competing weeds and grasses make the best sites for planting Christmas trees.

Soil and climatic conditions are important: Avoid wet, poorly drained soils, as well as heavy clay soils. Also avoid badly eroded areas. Trees, like other vegetative crops, do best on well-drained, loamy soils. The soil acidity is important. Some species do well on very acid soils, and others require a neutral or alkaline soil. Know the growth requirements of species to be planted and select the soil best suited.

Exposure is very important to certain species. Firs and spruces require northern to eastern exposures, while pines do well on southern and southwestern exposures. *Avoid frost pockets with all species.*

Elevation is a factor to consider. Fraser fir does best at elevations over 2,000 feet, while spruces can be grown down to 1,500 feet. Pines do well at lower elevations. A wider variety of Christmas tree evergreens grows better at the cooler, higher elevations of the state.

What can a grower pay for land? An exact value cannot be placed on land beyond which a grower ceases to make a return on his investment. Many factors have to be taken into consideration; such as, markets, species to plant, taxes, roads, etc. Christmas trees are now being planted on land valued from $10 to $200 per acre. With intensive management a grower could pay $100 per acre for good land and still expect a fair return. Do not make the mistake of buying land unsuitable for Christmas tree production even though the price is cheap. Good land at a reasonable price is the best buy.

Diversify the plantation: Every grower should plant two or more species if his soil and climatic conditions permit. The buyer likes a choice of trees, and what appeals to one might not appeal to another. The saying, "Do not put all your eggs in one basket," holds true for the Christmas tree grower.

In determining the percentage of different species to grow, consider soil conditions, geographic location, and available seedling supply. For the three major geographic locations in North Carolina the breakdown might be as shown in the following table.

Table 4. Percent of Each Species to Plant

Geographic Location	Species	Percent to Plant
Coastal Plain	Redcedar	70
	Scotch pine	20
	Other pines	10
Piedmont	Redcedar	40
	Scotch pine	20
	White pine	30
	Other pines	10
Mountains	Fraser fir	60
	White pine	20
	Norway spruce	5
	Douglas fir	10
	Other firs and spruces	5

To determine the best species to plant on your particular site and soil conditions, contact your local county agricultural agent or forester.

Planting Your Christmas Trees

The success of your Christmas tree plantation will be determined largely by your choice of planting stock, care given the seedlings until planted, and how you plant them.

Choose the right type of planting stock: Choosing the right planting stock in terms of age, size, and quality is very important. The North Carolina Division of Forestry tree nurseries are now producing the following planting stock for sale:

Fraser fir, 2 - 0 and 2 - 1[1]
Douglas fir, 2 - 0
White pine, 2 - 0
Scotch pine, 1 - 0 and 2 - 0
Virginia pine, 1 - 0
Arizona cypress, 1 - 0
Redcedar, 1 - 0

[1] *The planting stock is designated by numbers to show the age from seed and the number of years in transplant beds. 2 - 0 indicates the seedlings are 2 years in seedbed and 0 years in transplant bed. 2 - 1 means 2 years in seedbed and 1 year in transplant bed.*

Transplants of Fraser fir are necessary because of slower growth. Information on other recommended fir and spruce transplants can be obtained from the Extension Forester, State College Station, Raleigh, North Carolina.

Plant during the right time of year: The exact planting dates will depend on your geographic location. Plant trees during the dormant season. Use the following table as a guide:

Table 5. Planting-Season Guide

Location	Planting Date
Coastal Plains	February through March
Piedmont	February through April
Mountains	March through April

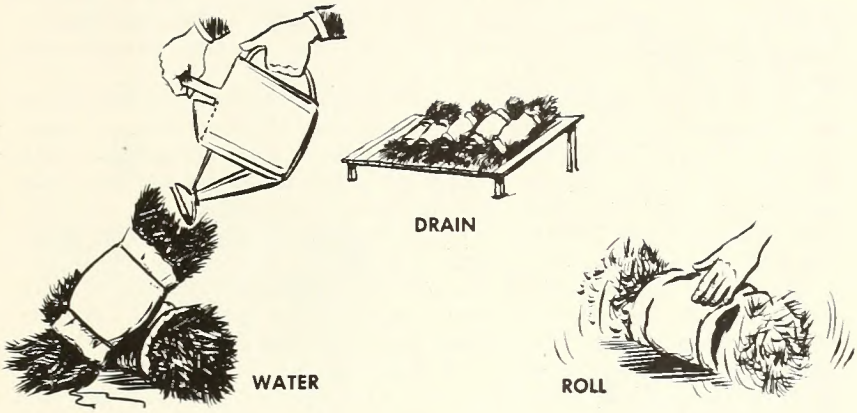
Note: Avoid planting in dry soil or when ground is sopping wet; also, never plant in freezing weather or when ground is frozen.

Planting cost: Cost of planting will vary according to site conditions, topography, and available labor. The following table indicates an average time per 1,000 seedlings under different conditions:

Table 6. Labor Requirements for Planting 1,000 Tree Seedlings

Equipment Used	Conditions	Man-Hours Required
Mattock	Rough, rocky land	26
Mattock or bar	Smooth—Piedmont, mountains	13
Bar	Light, easy-to-work land	7 to 10
Machine	Open, smooth land	3 to 6

Plant enough trees per acre and space them properly: Pine Christmas tree varieties tend to grow wider at the base than the firs and spruces. Thus they need wider spacing in the field to enable them to develop



fully into a quality Christmas tree without crowding. The following spacings are recommended for the various species of Christmas trees:

1. Fraser fir—4 by 4 feet
2. White pine—5 by 5 feet
3. Redcedar—5 by 5 feet
4. Virginia pine—5 by 5 feet
5. Arizona cypress—5 by 5 feet
6. Scotch pine—5 by 5 feet
7. Douglas fir—4 by 4 feet
8. Norway spruce—4 by 4 feet

Table 7. Number of Trees Required to Plant One Acre at Different Spacings

Spacing (Feet)	Number of Trees
4 x 4	2,722
5 x 5	1,742
6 x 6	1,210
7 x 7	889

Take care of seedlings upon arrival: If you are going to plant your seedlings within a 4-week period after they arrive, they can be safely held in the shipping package, provided you do the following:

1. When seedlings arrive, pour water into the open end of package. Roll package around on ground to wet all moss and roots thoroughly. (See drawing above.)
2. Store package in some *cool building where there is no danger of freezing*. Store off ground on racks. Raise one end of bundle to allow drainage.

3. Repeat watering and rolling process at least once each week.

Moving trees to planting site: From time trees arrive until they are finally set out, *see that roots are not allowed to dry out.* Failure to do this has been the main cause of unsuccessful planting.

Carry trees from package to planting site in a water bucket a third to half full of thin, creamy mud. A crumbly clay is ideal for mixing the mud. Be sure to remove trees from bucket one at a time as each hole is dug.

Use the right planting method: Several planting methods have been used successfully, depending on the particular planting site and topography. In the Coastal Plain and Piedmont regions, most open-field planting is being done by tree-planting machines. On cutover land and rough, hilly sites, the planting bar or dibble is most commonly used. In the upper Piedmont and mountains, the mattock and spade are still the most popular planting tools.

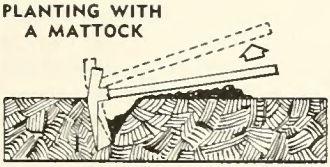
If planting site is suitable, the machine method of planting is more efficient. Some tree planters are equipped so that trees can be planted equal distances apart. This is ideal for Christmas tree planting where mowing will be used for weed and grass control.

On areas too rough for machine planting, the planting bar has proved to be the best and most efficient method of planting.

The following illustrations will show how the Christmas tree seedlings should be planted, using the different methods discussed.

Mowing for weed control.

PLANTING WITH A MATTOCK



Drive blade straight into ground. Raise up handle and pull dirt to edge of hole. Repeat until hole is deep enough so roots of seedling will not be crowded.

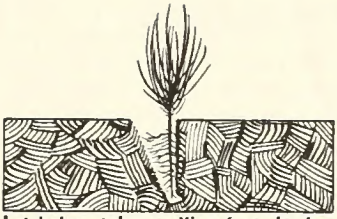
Take seedling from water bucket. Place against sharp side of hole so that tree is about as deep or a little deeper than it stood in the nursery bed. Exception —Longleaf pine should be planted so that base of terminal bud is just above ground line.

Partially fill in hole, packing the soil with your hands.

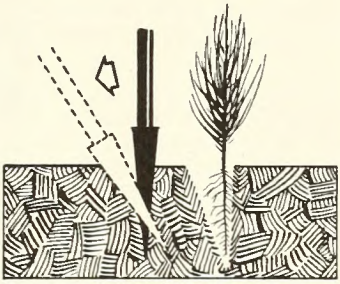
Finish filling hole and pack soil firmly with your feet.

PLANTING WITH A SPADE-TYPE TOOL OR BAR

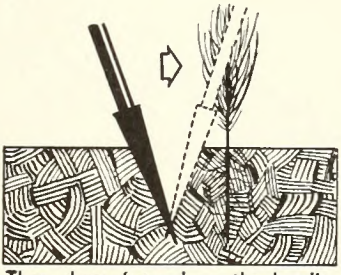
Drive blade straight into ground. Pull back on handle to open hole. Lift tool out of hole.



Let helper take seedling from bucket and place in hole. Have him hold it against sharp side of hole at correct depth.



Drive planting tool into ground about 3 inches behind planting hole. Pull back on the handle first. This closes the bottom of the planting hole.

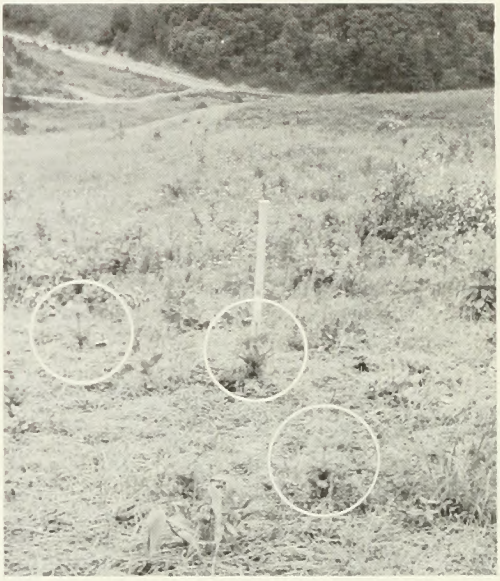


Then shove forward on the handle, clamping the dirt tightly around the top of the tree.

Stamp against side of hole with heel.

Protection

Protect young trees from excessive weed and grass growth: Protection of young Christmas trees from excessive weed and grass growth is probably one of the biggest problems facing growers today. Without an adequate control program, planting will result in poor survival, slowed growth, and irregularly shaped trees. On very fertile, moist sites, weeds, grasses, and briars will take their toll the first 2 to 3 years. On poor sites where fertilization is used, weed and grass growth will completely crowd out young trees.



Chemical weed control plot.

The control method will depend on the topography of the site, available equipment, and labor. In the Coastal Plain and Piedmont areas, where the land is flat to moderately sloping, *mowing* is very effective. The number of mowings per year will depend on the weather and site. Usually, two to three mowings per year are adequate. Cultivation is not recommended. Even shallow cultivation close to the young Christmas tree seedlings will cause some damage to the roots.

In the upper Piedmont and mountains, planting sites are often too rough and steep for mowing equipment. Other methods of control will have to be used. Some Christmas tree growers are removing competing growth with hand tools. This method is slow and expensive. The cost will usually make it prohibitive.

Chemicals are gradually coming into use as a weed-and-grass killer. Several have been used, but simazine shows the best results. It can be applied in either 80W wettable powder or 4G granular form. Apply

simazine at the rate of 2 to 4 pounds of active ingredients per acre. Before broad recommendations can be made, more tests should be run. Growers should try it on small plots to test its effectiveness. Mow area to be treated, if possible, so that chemical can reach the root zone of the weeds and grasses. Apply in the fall or early spring. Contact your local county agricultural agent for information on how to mix and apply this chemical.

Protect plantation from woody-growth encroachment: Woody growth is difficult to control in a Christmas tree plantation. Cutting of such growth usually results in excessive sprouting from the stump, causing competition to become steadily worse.

There are two methods of control:

1. The first is to pull out or grub the brush and trees and dispose of them. This method is costly and usually ineffective if plantation is adjacent to a woody growth seed source.

2. The second and most effective method is to poison the lower 6 to 12 inches of stem of unwanted brush with a solution of 2,4, 5-T mixed in fuel oil at the rate of 1 gallon of 4-pound active acid 2, 4, 5-T to 25 gallons of No. 2 fuel oil. This will not only kill the brush but will keep it from resprouting. This method will leave dead stems on the site which will soon decay and can be removed.

Regardless of the method you use, deaden all possible seed trees or remove them from surrounding areas or fence rows. If the seed source is not removed, you will have a constant battle to keep out the woody growth.

Hardwood growth here must be removed before planting Christmas trees.

Protect plantation from fire: Fire is a hazard to the Christmas tree plantation. Take steps to prevent fire outbreaks and to control them if started. Break up large plantations into smaller blocks and establish firebreaks around each block. The fire lanes can be used as harvest roads. These should be from 12 to 15 feet wide. Plowing or disking once or twice a year should keep them in good condition.

Keep on hand, at easily accessible points, fire-fighting equipment such as fire rakes, mattocks, and back-pack water pumps.

During dry periods, take precautionary measures to prevent employees or the public from starting fires through carelessness. If public hunting and fishing are allowed, post fire-prevention signs at easy-to-see places. In particularly dangerous dry periods, make spot checks each day.

Protect plantation from livestock and damaging rodents: When allowed to graze the plantation livestock will damage young trees excessively. They browse the young trees, brush against them and compact the soil, causing slower growth and poor quality. You can easily keep livestock out of the plantation. *Remember*, you cannot grow Christmas trees and livestock on the same area.

In some cases, extensive damage to pine trees by *pine mice* has been found. This condition is usually associated with areas of heavy grass growth. Control of the grass is usually sufficient to keep the pine-mouse population under control. Where this is not practical, put poison bait in the mouse tunnels or runways so that only mice can reach it. Contact your county agricultural agent for recommendations on bait and application.

Protect plantation from insect and disease pests: Insects are a particular hazard to any Christmas tree plantation. Different insects usually attack different species of trees, but in many cases the same insect will attack many different species. You will need to know about insects that attack evergreen trees. Diseases are less a hazard than insects, but certain diseases can cause damage to your young trees. Specific control recommendations for diseases and insects are covered in a separate bulletin. Check with your local county agricultural agent for detailed recommendations.

Fertilizing Your Christmas Trees For Faster Growth

Fertilization can stimulate Christmas tree growth. Redcedar is particularly responsive. Fertilizer promotes growth and helps to give trees a deep, richer color, which is important to the sale. Fertilize young trees when they start growing in the spring. Apply only what is needed, as over-application causes excessive weed growth.

Fertilize only where you plan a weed-and-grass-control program. Otherwise, the young seedlings will be choked out by excessive weed growth.

When using commercial fertilizer, apply it around the tree in a 1-to-2-foot radius. A balanced commercial fertilizer with an 8-8-8 or 6-12-12

Sheared tree. Note its shape and compactness.

Unsheared Fraser fir. Note open top and general poor shape.

ratio applied at about 200 to 300 pounds per acre has given good results. When applying fertilizer to young seedlings, a 6-ounce frozen-juice can two-thirds full is sufficient. Increase the amount for larger trees.

Usually, two applications are enough—the first after the trees are planted and the second a year before the trees are ready to harvest. Fertilizer requirements will vary with different soils; therefore, check with your county agricultural agent.

Shearing For Better Quality

Shearing is the most important cultural practice a grower can use to develop a high-quality Christmas tree.

Experienced growers in other states have found that economic production of high-quality Christmas trees is impossible without shearing during development. Unless such work is done, a plantation may produce 50 to 70 percent spindly, low-quality trees.

The best time to shear: The timing of the shearing operation is important. For *white pine* and *cedar* the best time for shearing is from June 15 to July 15, or when the new spring growth is complete, and right before new buds are formed. Shearing should begin when the needles are about half-grown and begin to pull away from the stem. For *Fraser fir* and *Norway spruce*, shearing during the dormant season, usually between October and March, has brought good results.

Shear the trees properly: Hedge shearers with 8-inch blades generally are used for shearing. Both terminal and lateral stems of the new growth are cut back to increase compactness and symmetry in the tree. No cut-and-dried rules can be laid down. It requires good

Shearing terminal leader to control compactness.

Shearing lateral branches to control shape and compactness.

judgment on the part of the worker. He should visualize the type of tree the consumer likes best and shear tree with that in mind.

A few important points to remember on shearing are:

1. **Keep the terminal growth cut back to not over 10 to 12 inches height growth for 1 year.**
2. **Cut back the lateral branches enough so that the width of the tree will be in proportion to the height.**
3. **Start shearing when the tree is 2 to 3 feet high, or when the terminal shoot exceeds 12 inches in length.**
4. **Shear each year after starting until the year before the trees will be harvested.**
5. **Shear cedars and pines in early summer, usually from June 15 to July 15. Shear firs and spruces during dormant season.**
6. **When cutting 2- or 3-year-old wood on pine, cut back to the next lower whorl of branches or to a lateral bud on the twig.**

Shearing stimulates bud formation on pine: Shearing the new wood of pines at proper time of year stimulates formation of terminal buds. Usually, the buds on a sheared twig are double the normal number. This increase in number of buds, which form new branches, will improve the compactness and density of the tree.

Shearing 2-or 3-year-old wood does not stimulate branching but tends to reduce total foliage on tree. This older wood does not produce buds and will die back to the next side branch.

Shearing cost: The cost of shearing is reported by Christmas tree growers to be from 1 to 3 cents per tree for each shearing.

Generally, three to five shearings are necessary to produce a high-quality Christmas tree. When shearing cost is compared to the increased value of sheared trees, the increased returns more than justify the cost.

Harvesting Methods

Since trees grow at a varying rate, harvesting a plantation will take from 1 to 3 years. Some trees will mature 1 to 2 years earlier than others within the plantation.

Three harvesting methods are generally used:

1. The grower cuts and markets the entire crop in 1 year. It is usually necessary to let trees grow an extra year or two to allow most of the trees to reach market size. Trees too small for marketing are either cut into boughs or destroyed. The advantages of this method are the low cost of harvesting and clearing the area for replanting the following spring.
2. The second method is to harvest the trees on an area as they reach merchantable size and replant as harvested. This involves cutting over an area 2 or 3 years before all trees are to be harvested. As trees are removed, young seedlings are planted in their places the following spring. This method produces a greater yield per acre, but increases in harvesting costs may well offset the increased yield.
3. Same as No. 2, but do no replanting until entire crop is harvested.

Cutting trees for harvest: Cut trees with a sharp saw at right angles to the stem to give them a flat base. Cutter should know market specifications such as height, straightness of stem, length of handle, symmetry, and fullness of foliage.

The trees are dragged by hand to a specified loading area. Loaded on wagons or sleds they are hauled to the nearest truck-loading point. It is a good idea to sort the trees as they are unloaded at the central out-loading point according to species, height, and quality. This will result in less handling of the trees when buyers want to pick their trees at the loading point.

When trees are cut in advance of shipping dates, be sure to protect them from drying or ice damage during the waiting period. A barn floor makes a good storage area.

Large growers may wish to hire additional labor at harvest time to enable them to cut and load out at the same time. This practice will lower handling costs but may cause delay to the truckers in waiting for the trees.

Marketing

Marketing methods will vary according to buyers' demands for quality and services. A grower should take special pains to grow a quality tree to meet consumer requirements. His trees should measure up to certain specifications so buyer can depend on getting satisfactory trees from him year after year without having to inspect the trees at the plantation. This will facilitate marketing and help keep satisfied customers.

United States Department of Agriculture standard grades for Christmas trees may be used as a guide in grading trees for sale. If both grower and buyer know these standard grades and accept them, they can make tree sales by phone or letter without "on the ground" inspection.

The grower should label the tree accurately according to species, height, and general quality in terms of color, density, and shape. This will build a good seller-buyer relationship.

It pays to advertise your product: A grower can increase his sales by making a brochure of his salable trees and sending it to all prospective buyers in his area. Brochure should include the species, size, quality, selling method (on the stump, at roadside, or delivered), and price expected. Some growers might want to include pictures of their over-all plantations and individual trees.

Do a good job selling your product: Sales may be made directly to consumers, either at the plantation or retail yards operated by the grower. More often, growers sell to wholesalers, retailers, or truckers.

Most growers do their own cutting and harvesting, but in some cases they may tag their trees and let the buyers do the cutting. It is usually better for grower to do his own cutting and harvesting to prevent highgrading and damage to the plantation.

At assembly points it is a good practice to separate the trees in piles according to species, size and grades. This will enable the buyer to make a quick selection of the size, number, and kind he wants.

When cutting a large number of trees for specific buyers, it would be advisable to have a performance contract signed by both the buyers and seller. Usual terms call for a one-third payment when the contract is signed and the balance when the trees are picked up.

Pricing: With the Christmas tree market becoming more competitive, growers should keep a complete record of production, harvesting, and marketing costs. North Carolina growers could very well price themselves out of business unless they establish a realistic pricing system. Efficient growers are due a fair return on their investment and should price their trees accordingly.

The large grower is inclined to sell his trees in large quantities to wholesalers or retailers. He is obliged to move thousands of trees each year and will make price concessions to do this. Usually, his production cost per tree will be less than that of the small grower; and he can afford to sell for less in large quantities and still make a fair profit.

The small grower, on the other hand, will market his trees in small lots direct to the local retailer, or retail his own trees. He will offer more services, such as letting a buyer select and cut his own trees or sell on consignment. Thus he takes part of the marketing risk. By offering these additional services, he can expect more per tree.

There is considerable risk in retailing Christmas trees. The retailer's margin need not be so high if the grower assumes part of the risk by absorbing all or a part of the loss on unsold Christmas trees and by

Three-yeor-old turn-up from old stump. Grows fost but requires more shearing.

delivering trees as the retailer needs them. This decreases the possibility of having large numbers of trees on hand after Christmas.

As in any other business, the small operator will eventually find himself in a price squeeze; and, consequently, will be forced to group with other small growers and sell on a volume basis. To realize a fair return when trying to compete with the larger growers' prices, he will have to increase the efficiency of his operations and improve the quality of his product by following recommended cultural practices.

The Second Crop

There are two methods of establishing the second crop: One is to *replant with seedlings,* and the other is to use *stump culture* or *turn-ups.*

Stump culture consists of leaving the lower live whorl of branches at the base of the tree when harvesting. As these limbs turn up during the next year, leave the most promising ones to grow into the next Christmas tree. This method is not too satisfactory, due to the extra work needed to develop a good-quality tree. Therefore, the extra cost involved may make it more expensive than replanting.

Conclusions and Summary

As a grower of Christmas trees you will need to consider the following facts in growing Christmas trees for a profit:

1. Christmas tree crops require intensive management to produce a quality product.
2. Selection and preparation of planting sites are very important from the standpoint of growing quality Christmas trees for market at a competitive price. In addition, such factors as accessibility to roads, topography, cost of the land, soil type, vegetative cover, fire risk, exposure, and elevation should be considered very carefully.
3. Selection of the right Christmas tree species for your site and its market appeal should be carefully considered.
4. Diversify your plantings. Do not plant all of one species. The consumer likes a choice.
5. Select good planting stock, take care of the seedlings, and plant properly to insure a good survival of healthy trees.
6. Control competing weeds, grasses, and brush to insure a fast-growing, well-formed tree.
7. Shear the tree properly at the right time to improve quality and increase profits.
8. Protection is a must. Keep livestock out of the plantation at all times. Carry out a good insect-and-disease-control program and keep out fire.
9. Use proper harvesting techniques that are adapted to your situation.
10. Know your markets, and sell wisely.
11. For more information regarding planting stock, planting procedures, cultural practices, and insect-and-disease control, contact your local County Agricultural Agent.

Cost and Return Work Sheet on Producing and Marketing Fraser Fir Christmas Trees in Western North Carolina[1]

Expected net return per acre on Christmas trees from well-managed stands, based on seven-year rotation. Current costs are compounded annually at 4% carried through for the entire rotation.

Cost Table (Input)

		4% comp.
1.	Interest on land investment—$75.00 @ 4%	$ 23.70
2.	Property tax—25¢ per acre per year	2.06
3.	Lond preparation—$10.00 per acre (First year preceding planting)	13.16
4.	Seedlings (Fraser fir 2 - 1 stock) 1960-61 $40.50/M, planting 2700 per acre	143.90
5.	Plonting cost—$15.00 per thousand (estimate)	53.30
6.	Shearing 3-4-5-6 yr. 2160 trees (survivol—based on 80%)—2½¢ per tree	284.26
7.	Weed cantral—½¢ per tree per year	88.85
8.	Insect and diseose control (3¢ per tree—estimate) 1 applicatian during rotation	75.82
9.	Administrotian and inspection @½¢ per tree per yeor	88.85
10.	Harvesting (1750/A) bosed an 65% @ 25¢ per tree	438.00
11.	Sales expense—1½¢ per tree	26.25
12.	Maintaining harvest roads and fire lanes $10.00 per acre per year	81.05
	Total estimated cost	$1,319.20[2]

Return Table (Output)

1750 Fraser fir per acre @ $1.50/tree	$2,625.00
Less cost	1,319.20
Net return per acre	1,305.80
Net return per acre per year	186.54

[1] *Based on 1959 dollars.*
[2] *$1,060.56 of this total is for labor.*

To Be A Successful Christmas Tree Grower...

1. Select the proper species
2. Control weeds and grass in your plantation
3. Shear to produce quality tree
4. Market wisely